

Notice of Allowability

Application No.

10/552,102

Examiner

Elias Ullah

Applicant(s)

HANNA ET AL.

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 10/17/2007.
2. ☒ The allowed claim(s) is/are 1-19.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date 10/3/2005
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

DETAILED ACTION

This office action is in response to an election restriction requirement filed on 10/17/2007.

Election/Restrictions

Applicant's election without traverse of claims 1-19 in the reply filed on 10/17/2007 is acknowledged.

This application is in condition for allowance except for the presence of claims 20-28 directed to an invention non-elected without traverse. Accordingly, claims 20-28 has been cancelled.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

The application has been amended as follows:

Cancel claims 20-28.

Allowable Subject Matter

Claims 1-19 are allowed.

REASONS FOR ALLOWANCE

The following is an examiner's statement of reasons for allowance: with respect to claim 1, there is no prior art available or obvious motivation to combine elements of prior art which teach disposing a GaAs single crystal as a substrate in a metal

organic chemical vapor deposition (MOCVD) reactor; preparing Al, Ga, In vapors by thermally decomposing organometallic compounds of Al, Ga, and In; preparing Zn vapors by thermally decomposing an organometallic Zn compound; preparing P vapors by thermally decomposing phosphine gas; simultaneously supplying the Al, Ga, In, P, Se, and Zn vapors to a region for epitaxial crystal growth on the substrate; and epitaxially growing a GaAlInP crystal doped with Zn and Se on the substrate; wherein flow rates of the Zn and Se vapors supplied to the region for epitaxial crystal growth are controlled to produce a heavily doped GaAlInP compound semiconductor with Zn serving as a p-type dopant at an atomic ratio of Zn:Se greater than two in the GaAlInP crystal. Claims 2-9 are dependent on claim 1.

The following is an examiner's statement of reasons for allowance: with respect to claim 10, there is no prior art available or obvious motivation to combine elements of prior art which teach disposing a GaAs single crystal as a substrate in a metal organic chemical vapor deposition (MOCVD) reactor; preparing Al, Ga, In vapors by thermally decomposing organometallic compounds of Al, Ga, and In; preparing P vapors by thermally decomposing phosphine gas; preparing group II element vapors by thermally decomposing an organometallic group IIA or IIB compound; preparing group VIB vapors by thermally decomposing a gaseous compound of group VIB; simultaneously supplying the Al, Ga, In, P, Se, and Zn vapors to a region for epitaxial crystal growth on the substrate; wherein the group IIA or IIB and group VIB vapors supplied to the region for epitaxial crystal growth produce a doped GaAlInP compound semiconductor with a group IIA or IIB element serving

as a p-type dopant having low group II atomic diffusion at an atomic ratio of II:VI greater than approximately two in the GaAlInP crystal. Claims 11-19 are dependent on claim 10.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elias Ullah whose telephone number is (571) 272-1415. The examiner can normally be reached on weekdays, between 8AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MICHAEL LEBENTRITT can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

E. Ullah, 11/5/2007

SCOTT B. GEYER
PRIMARY EXAMINER

SBG 11/9/07